

Nomenclature of Lipids

Appendixes A-C

Continued from Lip-3 and Lip-4

Contents of this section

- Appendix A: names of and symbols for higher fatty acids
- Appendix B: symbols recommended for various constituents of lipids
- Appendix C: abbreviated representation of gangliosides

Appendix A. Names of and symbols for higher fatty acids

Numerical symbol	Structure	Stems of		'Name' symbol
		systematic names ^a	trivial names ^b	
1 10:0	$\text{H}_3\text{C}-(\text{R})-\text{CO}_2\text{H}$ $-\text{[CH}_2\text{]}_8-$	Decano-	Capr- ^c	Dec
2 12:0	$-\text{[CH}_2\text{]}_{10}-$	Dodecano-	Laur-	Lau
3 14:0	$-\text{[CH}_2\text{]}_{12}-$	Tetradecano-	Myrist-	Myr
4 16:0	$-\text{[CH}_2\text{]}_{14}-$	Hexadecano-	Palmit-	Pam
5 16:1	$-\text{[CH}_2\text{]}_5\text{CH=CH[CH}_2\text{]}_7-$	9-Hexadeceno-	Palmitole-	Δ Pam
6 18:0	$-\text{[CH}_2\text{]}_{16}-$	Octadecano-	Stear-	Ste
7 18:1(9)	$-\text{[CH}_2\text{]}_7\text{CH=CH[CH}_2\text{]}_7-$	<i>cis</i> -9-Octadeceno-	Ole-	Ole
8 18:1(11)	$-\text{[CH}_2\text{]}_5\text{CH=CH[CH}_2\text{]}_9-$	11-Octadeceno-	Vaccen-	Vac
9 18:2(9,12)	$-\text{[CH}_2\text{]}_3(\text{CH}_2\text{CH=CH})_2[\text{CH}_2]_7-$	<i>cis,cis</i> -9,12-Octadecadieno-	Linole	Lin
10 18:3(9,12,15)	$-(\text{CH}_2\text{CH=CH})_3[\text{CH}_2]_7-$	9,12,15-Octadecatrieno-	(9,12,15)-Linolen-	α Lnn
11 18:3(6,9,12)	$-\text{[CH}_2\text{]}_3(\text{CH}_2\text{CH=CH})_3[\text{CH}_2]_4-$	6,9,12-Octadecatrieno-	(6,9,12)-Linolen-	γ Lnn
12 18:3(9,11,13)	$-\text{[CH}_2\text{]}_3(\text{CH=CH})_3[\text{CH}_2]_7-$	9,11,13-Octadecatrieno-	Eleostear-	eSte
13 20:0	$-\text{[CH}_2\text{]}_{18}-$	Icosano- ^d	Arachid-	Ach
14 20:2(8,11)	$-\text{[CH}_2\text{]}_6(\text{CH}_2\text{CH=CH})_2[\text{CH}_2]_6-$	8,11-Icosadieno- ^d		Δ_2 Ach
15 20:3(5,8,11)	$-\text{[CH}_2\text{]}_6(\text{CH}_2\text{CH=CH})_3[\text{CH}_2]_3-$	5,8,11-Icosatrieno- ^d		Δ_3 Ach
16 20:4	$-\text{[CH}_2\text{]}_3(\text{CH}_2\text{CH=CH})_4[\text{CH}_2]_3-$	5,8,11,14-Icosatetraeno- ^d	Arachidon-	Δ_4 Ach

	(5,8,11,14)	₃ ⁻			
17	22:0	-[CH ₂] ₂₀ ⁻	Docosano-	Behen-	Beh
18	24:0	-[CH ₂] ₂₂ ⁻	Tetracosano-	Lignocer-	Lig
19	24:1	-[CH ₂] ₇ CH=CH[CH ₂] ₁₃ ⁻	<i>cis</i> -15-Tetracoseno-	Nervon-	Ner
20	26:0	[CH ₂] ₂₄ ⁻	Hexacosano-	Cerot-	Crt
21	28:0	-[CH ₂] ₂₆ ⁻	Octacosano-	Montan-	Mon

^a Ending in '-ic', '-ate', '-yl', for acid, salt or ester, acyl radical, respectively.

^b Ending in '-ic', '-ate', '-oyl' for acid, salt or ester, or acyl radical, respectively.

^c Not recommended because of confusion with caproic (hexanoic) and caprylic (octanoic) acids. Decanoic is preferred.

^d Formerly 'eicosa' (Changed by IUPAC Commission on Nomenclature of Organic Chemistry, 1975).

Appendix B. Symbols recommended for various constituents of lipids

Name	Symbol ^a
For alkyl radicals ^b	R
Methyl, ethyl, . . . dodecyl	Me, Et, Pr, Bu, Pe, Hx, Hp, Oc, Nn, Dec, Und, Dod
For aliphatic carboxylic acids ^b	Acyl (not abbreviated), RCO-
Formyl, acetyl, glycoloyl, propionyl	Fo (or HCO), Ac, Gc, Pp
Butyryl, valeryl	Br, VI
Hexanoyl, heptanoyl, octanoyl	Hxo, Hpo, Oco
Nonanoyl, decanoyl, undecanoyl	Nno, Dco, Udo
Lauroyl, myristoyl, palmitoyl	Lau, Myr, Pam
Stearoyl, eleostearoyl, linoleoyl, arachidonoyl	Ste, eSte, Lin, Δ ₄ Ach
For glycerol and its oxidation products ^c	
Glycerol, glyceraldehyde, glycerone, glyceric acid	Gro, Gra, Grn, Gri
For 'glycosyl'	Ose
Glucose, galactose, fucose....	Glc ^d , Gal, Fuc ...
Gluconic acid, glucuronic acid	GlcA, GlcU ^e
Glucosamine ^f , <i>N</i> -acetylglucosamine	GlcN, GlcNAc
Neuraminic, sialic, muramic acids	Neu, Sia, Mur
<i>N</i> -Acetylneuraminic acid, <i>N</i> -glycoloylneuraminic acid	NeuAc ^g , NeuGc
Deoxy	d
Miscellaneous	
Ceramide, choline, ethanolamine	Cer, Cho, Etn ^h
Inositol, serine	Ins, Ser
Phosphatidyl, sphingosine, sphingoid, Phosphoric residue	Ptd, Sph, Spd, P

^a These symbols are constructed in analogy to those already in use for amino acids and saccharides [11, 13]; they may assist the abbreviated representation of more complex lipids in a way similar to the

peptides and polysaccharides. Prefixes such as 'iso-', 'tert-', 'cyclo' are specified in the symbols by lower-case superscripts (Prⁱ, Bu^t, Hx^c) or lower-case prefixes (iPr, tBu, cHx), unsaturation by, e.g., Δ^3 for a 3,4 double bond, Δ^3 for a 3,4 triple bond (cf. Proteins, Vol. I, pp. 96-108, in *Handbook of Biochemistry*, 3rd edition, edited by G. Fasman, CRC Press, Cleveland, Ohio, 1976). Many of these symbols are drawn from previously published Recommendations [11, 12]. See also Appendix A.

^b Systematic and recommended trivial names of unbranched, acyclic compounds only (cf. Appendix A). Other forms are created by prefixes (e.g., 'iso-', 'tert-', 'cyclo-'). See Appendix A.

^c These symbols form a self-consistent series for a group of closely related compounds. It is recognized that other abbreviations (but no symbols) are currently in use. (See Lip-2.12.)

^d Not Glu (glutamic acid) or G (nonspecific).

^e Recommended in place of GlcUA, the 'A' being unnecessary.

^f Approved trivial name for 2-amino-2-deoxyglucose; similarly for galactose (GalNAc), etc.

^g AcNeu was recommended earlier [11]. When it is necessary to differentiate between N-acetyl and O-acetyl derivatives, NeuNAc and NeuOAc (italicized locants, in contradistinction to GalNAc, etc.) may be employed.

^h May take the form OEtN< if substitution on the nitrogen atom is to be indicated.

Appendix C. Abbreviated representation of gangliosides

Lipid Document ^a	Designation according to Wiegandt ^b Svennerholm ^c	
1. I ³ NeuAc-GalCer	G _{Gal} 1NeuAc	-
2. II ³ NeuAc-LacCer	G _{Lac} 1NeuAc	G _{M3}
3. II ³ NeuGe-LacCer	G _{Lac} 1NeuNGl	-
4. II ³ (NeuAc) ₂ -LacCer	G _{Lac} 2NeuAc	G _{D3}
5. II ³ NeuAc/NeuGc-LacCer	G _{Lac} 2NeuAc/NeuNGl	-
6. II ³ NeuGc-LacCer	G _{Lac} 2NeuNGl	-
7. II ³ NeuAc-GgOse ₃ Cer	G _{Gtri} 1NeuAc	G _{M2}
8. II ³ NeuAc-GgOse ₄ Cer	G _{Gtet} 1NeuAc	G _{M1}
9. IV ³ NeuAc-nLcOse ₄ Cer	G _{Lntet} 1aNeuAc	G _{M1-GlcNAc}
10. IV ⁶ NeuAc-nLcOse ₄ Cer	G _{Lntet} 1bNeuAc	-
11. IV ² Fuc,II ³ NeuAc-GgOse ₄ Cer	G _{Gfpt} 1NeuAc	-
12. IV ³ NeuAc-nLcOse ₄ Cer	-	-
13.		

$\text{II}^3(\text{NeuAc})_2\text{-GgOse}_4\text{Cer}$	$\text{G}_{\text{Gtet}}2\text{bNeuAc}$	G_{D1b}
14. $\text{IV}^3\text{NeuAc}, \text{II}^3\text{NeuAc-GgOse}_4\text{Cer}$	$\text{G}_{\text{Gtet}}2\text{aNeuAc}$	G_{D1a}
15. $\text{II}^3(\text{NeuAc})_3\text{-GgOse}_4\text{Cer}$	$\text{G}_{\text{Gtet}}3\text{bNeuAc}$	-
16. $\text{IV}^3\text{NeuAc}, \text{II}^3(\text{NeuAc})_2\text{-GgOse}_4\text{Cer}$	$\text{G}_{\text{Gtet}}3\text{aNeuAc}$	G_{T1}
17. $\text{IV}^3\text{NeuAc}, \text{II}^3(\text{NeuAc})_3\text{-GgOse}_4\text{Cer}$	$\text{G}_{\text{Gtet}}4\text{bNeuAc}$	-
18. $\text{IV}^3(\text{NeuAc})_2, \text{II}^3(\text{NeuAc})_3\text{-GgOse}_4\text{Cer}$	$\text{G}_{\text{Gtet}}5\text{NeuAc}$	-
19. $\text{IV}^3\text{NeuAc}, \text{II}^3\text{NeuAc-GgOse}_5\text{Cer}$	$\text{G}_{\text{Gpt}}2\text{aNeuAc}$	-

^a To indicate linkage points and anomeric form: Fuc should be written ($\leftarrow 1\alpha\text{Fuc}$); NeuAc should be written ($\leftarrow 2\alpha\text{NeuAc}$); $(\text{NeuAc})_2$ should be written ($\leftarrow 2\alpha\text{NeuAc8}$); etc. If these features are assumed or defined, the short form used in this column is more convenient for use in texts and tables.

^b The subscripts to G (for ganglioside), from 7 on, have the meanings: Gtri = gangliotriose, Gtet = gangliotetraose, Litet = lactoisotetraose, Gpt = gangliopentaose, Gfpt = gangliofucopentaose [Wiegand, H. (1973) *Hoppe-Seyler's Z. Physiol. Chem.* **354**, 1049].

^c G = ganglioside, M = monosialo, D = disialo, T = trisialo. Arabic numerals indicate sequence of migration in thin-layer chromatograms [Svennerholm, L. (1963) *J. Neurochem.* **10**, 613].

Continued with Supplement: derivatives of phosphatidic acid

Return to main IUPAC nomenclature home page

Return to main IUBMB nomenclature home page

Return to Biochemical Nomenclature Committees home page



JOURNAL OF NEUROCHEMISTRY

HOME

R. D. Peavy, S. D. Sorensen, and P. J. Conn
Differential regulation of metabotropic glutamate receptor 5-mediated phosphoinositide hydrolysis and extracellular signal-regulated kinase responses by protein kinase C in cultured astrocytes

J. Neurochem., October 1, 2002; 83(1): 110 - 118.

[Abstract] [Full Text] [PDF]



JBC Online

HOME

S. R. Hawtin, A. B. Tobin, S. Patel, and M. Wheatley
Palmitoylation of the Vasopressin V1a Receptor Reveals Different Conformational Requirements for Signaling, Agonist-induced Receptor Phosphorylation, and Sequestration

J. Biol. Chem., October 12, 2001; 276(41): 38139 - 38146.

[Abstract] [Full Text] [PDF]



JOURNAL OF NEUROCHEMISTRY

HOME

F. Ciruela, M. J. Robbins, A. C. Willis, and R. A. J. McIlhinney

Interactions of the C Terminus of Metabotropic Glutamate Receptor Type 1{alpha} with Rat Brain Proteins: Evidence for a Direct Interaction with Tubulin

J. Neurochem., January 1, 1999; 72(1): 346 - 354.

[Abstract] [Full Text]



JBC Online

HOME

Y. Nakajima, T. Yamamoto, T. Nakayama, and S. Nakanishi
A Relationship between Protein Kinase C Phosphorylation and Calmodulin Binding to the Metabotropic Glutamate Receptor Subtype 7

J. Biol. Chem., September 24, 1999; 274(39): 27573 - 27577.

[Abstract] [Full Text] [PDF]



JBC Online


HOME

S. Moffett, L. Adam, H. Bonin, T. P. Lolsel, M. Bouvier, and B. Mouillac

Palmitoylated Cysteine 341 Modulates Phosphorylation of the beta 2-Adrenergic Receptor by the cAMP-dependent Protein Kinase

J. Biol. Chem., August 30, 1996; 271(35): 21490 - 21497.

[Abstract] [Full Text] [PDF]

**JBC Online** [HOME](#)

Y. Okamoto, H. Ninomiya, M. Tanioka, A. Sakamoto, S. Miwa, and T. Masaki

Palmitoylation of Human EndothelinB. ITS CRITICAL ROLE IN G PROTEIN COUPLING AND A DIFFERENTIAL REQUIREMENT FOR THE CYTOPLASMIC TAIL BY G PROTEIN SUBTYPES

J. Biol. Chem., August 22, 1997; 272(34): 21589 - 21596.

[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)

[HOME](#) [HELP](#) [FEEDBACK](#) [SUBSCRIPTIONS](#) [ARCHIVE](#) [SEARCH](#) [TABLE OF CONTENTS](#)

Copyright © 1995 by the International Society for Neurochemistry.